PETASCALE HPC DEPLOYMENTS: SUN'S PERSPECTIVE

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Requirements:

- >Detailed special build needs
- >Fast turnaround

System specs:

- >Sun^{SM} Customer Ready factory integration
- >Diskless Solaris™ 10 OS
- >512 nodes
- >16 racks
- >10 TeraFLOPS

Results:

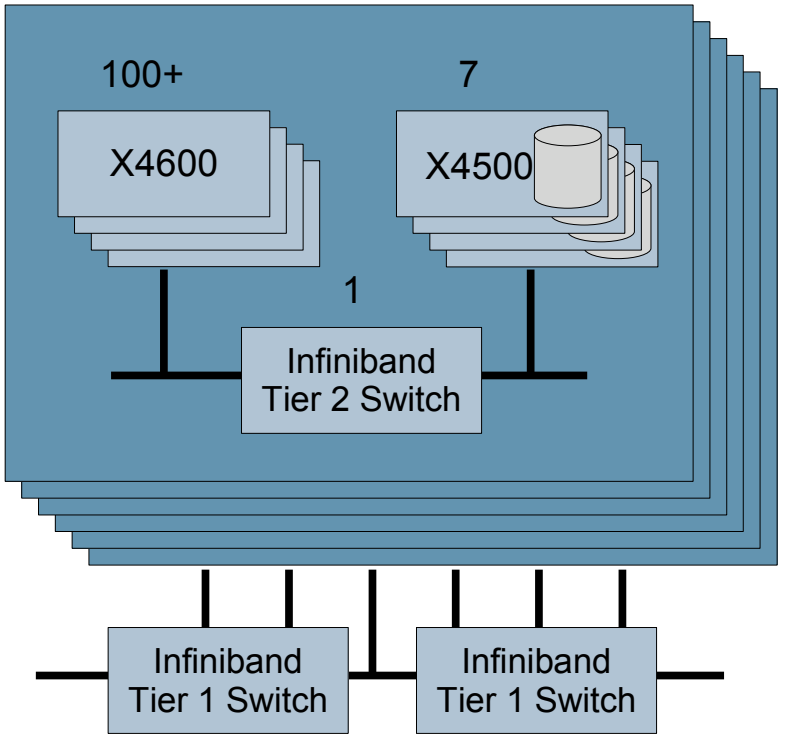
- >Running in 10 hours after delivery of last pallet

Mississippi State University

An HPC Center
CCS
Center for Computational Sciences

Tokyo Institute of Technology

Now delivering 47.38 TFLOPS; 38.18 TFLOPS installed in 31 Days

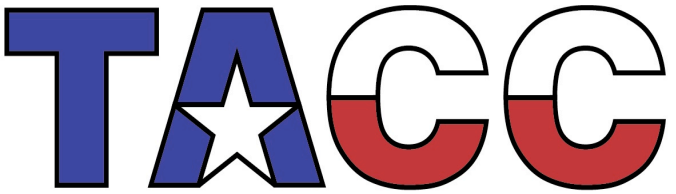


655	Sun Fire™ X4600 Servers
42	Sun Fire™ X4500 Data Servers
360	Clearspeed FP accelerators
80+	Racks
8	Voltaire InfiniBand switches
6	Linked sub-clusters
10,480	AMD Opteron™ cores
21	TeraBytes RAM
1	PetaByte storage
	Sun N1™ Grid Engine
	Sun N1™ System Manager
	Lustre parallel file system

Asia's fastest supercomputer

Next Step: Texas Advanced Computer Center

- TACC partners with Sun to deliver over 529 TFLOPS for NSF TeraGrid
  - Award in Sep/06, scheduled to be in production in Dec/07
  - If live today would be the fastest supercomputer in the world
- Based on:
  - AMD Opteron-based Sun Blade™ servers
  - 15,744 AMD Opteron quad core processors, in 3,936 nodes
  - Sun's large InfiniBand core switch technology
  - Sun StorageTek™ disk and tape



Some Observations about Very Large HPC Deployments

- Try to get as much integration as possible in the vendor's factory
  - Easier to build, test, debug, replace
- The relationship between the customer and vendor has to be based on trust and respect.
  - Customers have to be prepared to work together with vendor to resolve issues that only appear when actual implementation occurs.
  - Vendors must also trust the customer to expose any weakness of the architecture and systems. A lot of advances on technology and actual products happens that way.
- Never under-estimate the amount of services and resources required.
- Power, cooling and floorspace is the largest limitation and constraint.

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